Mandibular Primary First Molar with Single Root and Single Canal: A Rare Case Report

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Abstract
An extremely uncommon tooth developmental anomaly seen such as bilateral primary mandibular first molar with a single root and single canal. Various researchers found that due to failure of invagination of HERS leads to various anomalies in root morphology. A 9 year old girl with pain on lower left side of the jaw originated from mandibular left first molar. On right side there was also presence of 84 with single root. The tooth was treated by pulpectomy followed by restoration. Due to unusual morphology, the chance of endodontic mishaps is extremely high in the search of additional canal, which can be overcome by proper knowledge of root morphology and radiographic interpretation. [Journal of National Institute of Neurosciences Bangladesh, 2020;6(1): 67-71]

Keywords: Mandibular first molar; bilateral, primary; single root; single canal

Introduction
The process of tooth eruption and root formation is a complex process¹. Mesenchymal tissue during odontogenesis helps tooth formation which is the important component of functional cranial components consisting of enamel, dentine, cementum and pulp². Dental pulp is an ectomesenchymal origin consisting of soft gelatinous connective tissue which is surrounded by bilayered mineralized tissue³. There is a link between root development and tooth eruption⁴. After crown formation, the meeting point of inner and outer epithelium called “zone of reflexion or cervical loop”, the cell continue to divide and forms a double layer of cells as Hertwig’s Epithelial root sheath⁵,⁶. It starts formation of root portion.

Root canals are larger in deciduous teeth as enamel and dentine is thinner and there is no clear demarcation between pulp chamber and root canals⁷,⁸. The HERS usually grows down and surrounds the entire dental papilla and the most apical portion of dental papilla represents the future apical foramen. Two tongue-like projections grow inward towards the center from the lateral walls of root sheath and finally when projections merge in the center, two rooted molar is develop. Three rooted molar develops with the three projections grow from the root sheath, dividing the developing root structure into three portions⁹. Thus failure of invagination of HERS leads to various anomalies in root morphology⁹.

The success of root canal therapy is more challenging in anatomically variant root canal configuration in primary molars⁹. Thus proper knowledge of root morphology is necessary for communication,
diagnosis and treatment planning. Single-rooted primary mandibular first molar is a very uncommon morphologic variation and few cases are noted. In routine dental practice, we use periapical radiograph to evaluate the root canal configuration but these techniques have some limitations that compromise their reliability. Now-a-days computed tomography (CT) scan has been implemented to evaluate the three-dimensional anatomy of teeth and root canal morphology as well as unusual morphology of root canals. In this article, we had present a rare case of bilateral mandibular primary first molar with single root and single canal.

Case Presentation
A 9 year old girl who had met with pain on lower left side of the jaw for last 3 days, before she visited the Department of Paediatric Dentistry, Update Dental College & Hospital, Dhaka, Bangladesh for the treatment of left 1st molar. Patient had met with secondary caries and she has History of taking Restoration one month before. She had chief complaint of pain, which was mild in nature, persistent and had started three days back. The patient was rated as No.4 on Frankl’s Behavior Rating Scale (1962).Clinical examination with context to 74 revealed the crown size was normal with faulty restoration. We also get slight mobility of the teeth was within normal limits and depression of the tooth with digital pressure results in pain. With context to 74 and single rooted tooth with physiological resorption with presence of 34 was evident, on radiographic evaluation. On the basis of pain history and clinical examination, the case directed us as widespread inflammation of the pulp extending throughout the radicular filaments and radiologically was diagnosed as chronic irreversible pulpitis. On right side, there was also presence of 84 with single root and 85 with pulp therapy was found. Finally Single visit Pulpectomy was planned for the left primary mandibular first molar (74) followed by restoration, but stainless steel crown could not be given, as the parents were not keen about it. On the first appointment, after proper isolation access opening to root canal instrumentation was established by standardized technique. After working length determination (10 mm) biomechanical preparation was performed by using H- files. During working length determination two individual gutta percha was used to evaluate weather the canal type is Vertucci type IV rather than type I. Copious normal saline solution was used for irrigation of the canal throughout the biomechanical preparation. Finally obturation is done with calcium hydroxide based sealer (Metapex) in the canal to the desired length. Finally cavity is sealed with IRM. Five days later patient was recalled and temporary filling was removed and permanent restoration was done. Stainless steel crowns for the teeth could not be done as the parents did not want any further treatment.

Clinical and Radiographic Presentation

![Mandibular Left 1st Molar](image1)

![Mandibular Right 1st Molar](image2)

![Clinical photograph](image3)

![Initial Clinical photograph](image4)

![Initial radiograph](image5)
Access cavity preparation  Working Length Determination

After Obturation  After Restoration

Discussion

One of the important goal of paediatric dentistry is the preservation of primary teeth until eruption of permanent teeth for proper mastication, speech, aesthetics and correction of spacing. The anatomy of primary root canal have been surveyed by few researchers which are not consistent. Bagherian and colleagues found in Iranian population that two roots with four canals in four deciduous mandibular first molars Gupta et al and Hibbard et al also found same anatomy. The variations in the number of roots is shown in primary molars by various researchers. Single rooted primary mandibular first molar is extremely rare physiology which was not documented until 1973. Acherman et al and Gideon et al found out the first case in 10 year old child. It can occur unilaterally or bilaterally with frequent involvement of permanent dentition than primary dentition. It may be the cause of lack of proliferation of tooth germination from dental lamina and also some genes associated with tooth agenesis such as Msx 1 and PAX 9 have been identified.

It can cause the abnormalities such as fusion of roots or deep taurodontism characterized by apical displacement of pulpal floor and vertically elongated pulp chamber. The other abnormalities associated with the odontogenic anomalies are oligodontia, hypodontia, macrodontia, dens invaginatus, idiopathic generalized short root and pyramidal molars. Taurodontism and isolated pyramidal molars is found in 48.6% of cases. The morphology of tooth development effects by several environmental factors like radiotherapy, chemotherapy and trauma. It may be associated with fusion of the root or deep

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
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<th>Description of root anomaly</th>
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<tbody>
<tr>
<td>Ackerman et al</td>
<td>1973</td>
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<td>1991</td>
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<td>Anne Marie.H.Ngyen et al</td>
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<tr>
<td>Chow et al</td>
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<td>Bilateral double rooted maxillary Deciduous canines</td>
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<tr>
<td>Kelly’s et al</td>
<td>1978</td>
<td>One</td>
<td>Bilateral double rooted maxillary Deciduous canines</td>
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<td>Krolls et al</td>
<td>1980</td>
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<td>Micheal et al</td>
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<td>Double rooted maxillary left Deciduous canines. Three rooted Deciduous mandibular right first molar. Three-rooted Deciduous mandibular right first and second molars</td>
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<td>Mochizuki et al</td>
<td>2001</td>
<td>One</td>
<td>Double rooted maxillary Deciduous canines</td>
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<td>Orhan</td>
<td>2006</td>
<td>Three</td>
<td>Double rooted maxillary Deciduous canines</td>
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<td>Mayhull et al</td>
<td>1981</td>
<td>One</td>
<td>Three rooted Deciduous mandibular right first molar</td>
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<td>Curzon et al</td>
<td>1972</td>
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<td>Tratman et al</td>
<td>1938</td>
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<td>Falk et al</td>
<td>1983</td>
<td>One</td>
<td>Bilateral three rooted mandibular first Deciduous molars</td>
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<tr>
<td>Acs et al</td>
<td>1992</td>
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taurodontism. In our case such findings were absent. Some added radiograph with different horizontal angulation (20-degree mesial and distal angulation) is useful in evaluation of canal morphology.

Single rooted molar can describe by different terms, such as conical, fused and pyramidal. With connected roots and two separate canals refers to fused roots and pyramidal roots refers to single enlarged root canal in a single tapering root. In our case we found a pyramidal root. Also root abnormalities are more seen in females than males, as reported in our study. Causation of pyramidal root is due to failure of HERS to encircle completely the dental papilla during vertical growth or failure of the lateral tongue like projections to form completely.

Due to unusual morphology, the chance of endodontic mishaps is extremely high in the search of additional canal which can be overcome by proper knowledge of root morphology and radiographic technique. Radiographs such as 20 degree mesial and distal projection or CT scan to access three dimensional anatomy of tooth and its canal morphology helps to minimize the errors.

Conclusion
Due to unusual morphology, the chance of endodontic mishaps is extremely high in the search of additional canal, which can be overcome by proper knowledge of root morphology and radiographic interpretation.

References
After crown formation, the meeting point is a link between root development and tooth and pulp. Dental pulp is an ectomesenchymal origin. Odontogenesis helps tooth formation which is the introduction and forms a double layer of cells as Hertwig’s portion. Thus failure of invagination of HERS leads to dividing the developing root structure into three portions. Three rooted molar is develop. Three rooted molar develops with morphologic variation and few cases are noted. Length determination two individual gutta percha was performed by standardized technique. After working length restoration, but stainless steel crown could not be placed. Widespread inflammation of the pulp extending throughout the radicular filaments and radiologically revealed the crown size was normal with faulty complaint of pain, which was mild in nature.

It may be associated with fusion of the root or deep displacement of pulpal floor and vertically elongated molars. Taurodontism and isolated pyramidal molars are extremely rare physiology which was not documented out the first case in 10 year old child. It can occur associated with tooth agenesis such as Msx 1 and abnormalities are more seen in females than males.

Due to unusual morphology, the chance of endodontic therapy complications is due to failure of HERS to encircle completely the anatomy of tooth and it’s canal morphology helps to minimize the errors. Radiographs such as 20 degree mesial and distal configuration, accessory root canals in radicular pulp and clinical examination, the case directed us as single canal.

Finally cavity is sealed with IRM. Five days later computed tomography (CT) scan has been performed. Patient was recalled and temporary filling was placed. Finally, biomechanical preparation was performed. Type IV rather than type I. Copious normal saline irrigation was used throughout the biomechanical preparation. Finally, cavity is sealed with IRM. Five days later, the radiograph revealed the periapical inflammation resolved.

Due to unusual morphology, the chance of endodontic therapy complications is due to failure of HERS to encircle completely the anatomy of tooth and it’s canal morphology helps to minimize the errors. An in vitro study of root and canal morphology of human deciduous molars in an Iranian population. Journal of Dental Sciences (2013) 8, 321-327.


